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TRANSLATION

ION COUNTER

By

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AIR FORCE SYSTEMS COMMAND

WRIGHT-PATTERSON AIR FORCE BASE

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UNEDITED ROUGH DRAFT TRANSLATION

ION COUNTER

BY: A. P. Shechetilina

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FIRST LINE OF TITLE

ION COUNTER

By

A. P. Shchetilin

FIRST LINE OF TITLE

Known are ion counters, containing an aspirational condenser, tube voltmeter, dial indicator, fan and battery, which require for the calculation of ion concentrations the execution of additional functions, which reduce measurement accuracy. Furthermore, they have low sensitivity and are operationally unstable.

The proposed ion counter is distinguished by the fact that the aspirational capacitor is connected to the circuit of a tube voltmeter. This allows to make a direct reading of the number of ions and carry on long lasting observation over the measured ion concentration.

Another distinguishable feature of the proposed instrument is the use of a microammeter connected into the bridge balancing circuit. To insulate the tube voltmeter, measuring resistor and internal electrode of the capacitor they are enclosed in a metal housing, acting in the role of screen. Such an arrangement allows for a considerable increase in sensitivity of the instrument and to improve its operational stability.

In drawing is given the principal diagram of the proposed ion counter.

It contains a tube voltmeter 1, dial indicator 2, fan 3, battery 4, and aspirational capacitor with outer and inner electrodes 5 and 6.

At the time of measuring from battery 4 to outer electrode 5 is supplied an electric potential of definite polarity. On the inner electrode 6, measuring resistor 7 and grid of voltmeter tube 1 is fixed an electrostatic charge, equalling in magnitude to the charge of the outer electrode 5 and opposite to it in sign. The tube voltmeter 1, measuring resistor 7 and inner electrode 6 of the capacitor are isolated from battery 4 and outer electrode 5 and enclosed in a metal housing 8.

Ionized air is sucked in by the fan and moves between electrodes 5 and 6 of the aspiratory capacitor. The ions under the effect of the capacitor's electric field deviate, depending on the sign of the ion and electrode charge, to the side and settle on the electrodes. Ions falling on the internal electrode 6 of the capacitor, disrupt the electrostatic equilibrium of the system, as a result of which on resistor 7 will take place a voltage drop, under the effect of which through the resistor will flow a current I . The magnitude of current I connected with the number of n -ions, situated in 1 cm^3 of air is of the following dependence: $I = n \cdot e \cdot \frac{dV}{dt}$, where e -elementary charge of particle, and $\frac{dV}{dt}$ volume of air, sucked in by fan.

Connecting to resistor 7 a sensitive indicator and calibrating same directly in ions, it is possible to make a direct scale reading and to conduct long lasting observation over the ion concentration. When feeding to the outer electrode a positive potential on the internal electrode of the capacitor will settle positive ions and, vice versa, changing the value of the potential supplied to the outer electrode of the capacitor, it is possible to measure ions of variable mobility.

The proposed counter of ions may find broad application in medicinal industry, at enterprises and labs, where it is necessary to control the amount of ionized particles which are found in the air.

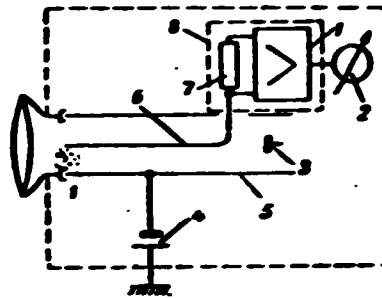
Object of invention

1. Ion counter, containing aspiratory capacitor, tube voltmeter, dial indicator, fan, battery, distinguished by the fact, that for the purpose of directly reading (counting) the number and time of observing ion concentration, the

aspiratory capacitor is connected into the circuit of the tube/volemeter/.

2. Counter according to par.1, characterized by the fact, that to increase the sensitivity of the instrument and the stability, is used a microammeter, connected to the bridge balancing circuit, and a tube voltmeter, measuring resistor and internal electrode of aspiratory capacitor isolated from the battery and outer electrode of the capacitor and enclosed in/the/ metal housing.

Drawing



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